$$M(\omega) = 20 \log_{10} |H(s)_{s=j\omega}|$$

$$\Theta(\omega) = \tan^{-1}[\frac{Im(H(s)_{s=j\omega})}{Re(H(s)_{s=j\omega})}]$$

$$H(s) = C\frac{\prod_{n=1}^{N}(s-a_n)}{\prod_{m=1}^{M}(s-b_m)}$$

$$M(\omega) = \sum_{n=1}^{N} 20 \log \sqrt{\omega^2 + a_n^2} - \sum_{m=1}^{M} \sqrt{\omega^2 + b_m^2}$$

$$\Theta(\omega) = \sum_{n=1}^{N} \tan^{-1}(\omega/(-a_n)) - \sum_{m=1}^{M} \tan^{-1}(\omega/(-b_m))$$

$H(s) =$
$1/(s-$
$a)$

$$t_p = \frac{\pi}{2}$$